

**Math Learning Goals**

- Substitute numbers into variable expressions.
- Evaluate algebraic expressions by substituting a value into the expression.
- Make connections between evaluating algebraic expressions and finding the n^{th} term of a pattern.

Materials

- linking cubes
- BLM 5.3.1

Assessment Opportunities**Minds On...****Small Groups → Forming a Variety of Representations**

Present this scenario to the class: A group of students is making a bicycle/skateboard ramp. The first day, they build the support using one brick. On each successive day, they add one brick to the base and one to the height of the support, making the support an L shape. (Day 2 uses 3 bricks, Day 3 uses 5 bricks, etc.)

Working in small groups, students represent the L-shaped supports in the following sequence:

- a physical representation using linking cubes
- a table of values (numerical representation)
- formula (algebraic representation)

Once students have established the rule algebraically, assist them in making the connection between the general term, e.g., $(2n - 1)$, $(1 + 2(n - 1))$ and the term number, n . Groups determine the number of blocks used on the 5th, 10th, 24th, 50th day by substituting into the general term formula.

Students make connections to prior learning while substituting variables with numbers.

Action!**Pairs → Investigation**

Model how to find the word value of “teacher” to help students determine the algebraic expression that they can use for finding the word values (BLM 5.3.1). Students individually find the point value for each word and check with their partners. Encourage students to develop and evaluate numerical expressions in the form 3 (the number of consonants) + 2 (the number of vowels) in question 1 and to generalize this pattern as $3c + 2v$ in question 2.

Whole Class → Presentation

Students present their words from question 3 and the class calculates the word’s value.

Curriculum Expectations/Observation/Anecdotal Note: Assess students’ ability to substitute numbers for variables and evaluate algebraic expressions.

Note: order of operations is important.

Consolidate Debrief**Whole Class → Make Connections**

Students brainstorm life connections for substitution into algebraic equations. Ask: What are some common formulas? (e.g., $P = 2l + 2w$, Area = $b \times h$)

How many variables are in the formula $P = 2l + 2w$? (3)

If we want to know the perimeter, P , for how many variables will we have to substitute measures? ($2 - l$ and w)

If we want to know the length, l , for how many variables will we have to substitute? ($2 - P$ and w)

What are some of the advantages and disadvantages of using equations?

Possible answers could include:

- costs of production
- sports scores
- travel costs
- transportation costs

Home Activity or Further Classroom Consolidation

Vowels are worth 2 points and consonants are worth 3 points. Create and evaluate a numerical expression for the point value of five of your classmates, e.g., The point value for the name John would be $2(1) + 3(3) = 11$.

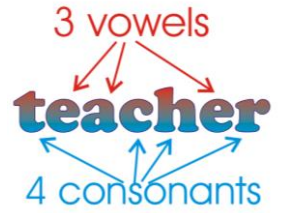
Application
Concept Practice

5.3.1: Word Play

In this word game, you receive 2 points for a vowel, and 3 points for a consonant.

Word Value = $3 \times$ the number of consonants + $2 \times$ the number of vowels

The word *teacher* would be scored as 4 consonants worth 3 points each, plus 3 vowels worth 2 points each.



$$\begin{aligned}\text{Word Value} &= 3(4) + 2(3) \\ &= 12 + 6 \\ &= 18\end{aligned}$$

1. Determine the value of each of the following words. Show your calculations.
 - a) Algebra
 - b) Variable
 - c) Constant
 - d) Integer
 - e) Pattern
 - f) Substitute
2. Write an algebraic expression that you could use to find the point value of any word.
3. Use your expression to calculate the value of six different words. Can you find words that score more than 30 points?
 - a)
 - b)
 - c)
 - d)
 - e)
 - f)